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JAPANESE TRADE STUDIES

Special Industry Analysis
No. 27

MARINE PRODUCTS

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Foreign Economic Administration
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FOREWORD

This is one of a series of Special Industry Analyses discussing from a commodity or individual industry point of view the outstanding items entering into the trade of Japan proper with its Empire and with foreign countries. These analyses are a part of a larger project which includes compilations (annotated) of the imports and exports of Japan proper by sources and destinations; surveys of certain of the colonial areas, emphasizing their Empire and foreign trade and postwar problems relating thereto; an over-all study of the trade of Japan proper; and a survey of Japan's shipbuilding industry and shipping services and requirements in the prewar period. In all of the studies Manchuria has been included as an Empire area owing to the political, economic, and military dominance of Japan in that area, especially during the last decade.

Most of the data in these analyses were taken from official and semi-official Japanese sources. Not only have errors and inconsistencies frequently been detected within individual volumes, but many data from different sources supposedly reporting on the same subject are irreconcilable. It is very likely that large shipments of goods reportedly moving to Kwantung from Japan have been in large part merely transshipments destined for Manchuria. In addition, the data probably exclude large shipments of commodities made to and from Empire areas for military purposes.

The present report is one of a number which were prepared during 1944 and 1945 for the Foreign Economic Administration by members of the staff of the United States Tariff Commission. Owing to the desire of the Foreign Economic Administration to obtain this material as promptly as possible, the reports were not reviewed by the Tariff Commission. All statements of fact or opinion in these reports are attributable to the individual staff members who prepared them. The reports were originally intended for the confidential use of government agencies, but are now being made public with the consent of the Foreign Economic Administration.

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Introduction and Summary

Of the various industries in Japan, none appears to be so indigenous and so well adapted as the fisheries. The country has a long, indented coast-line, with excellent fishing ports, and a large part of the population have been fishermen from time immemorial.

The annual world catch of fish and other marine products in the years immediately preceding World War II is estimated at 35 billion pounds. Japan, including Korea (Chosen) and Kwantung (leased territory), accounted for about 28 percent of the total.

The annual value of production by Japan proper (including value of processed products) usually approximated 600 million yen, of which products valued at 440 million yen were consumed in Japan and the remainder, valued at 160 million yen, were exported, principally to the United Kingdom, the United States, Germany, France, and countries of the Far East. Exports to Empire areas were relatively small compared to exports to foreign countries. Exports of fishery products as a whole accounted for about 5 percent of the value of exports of all commodities from Japan proper to all areas.

Imports of fishery products from foreign countries were negligible, as were those from the Colonial concessions with the exception of Korea. Imports from Korea were valued at 2 million yen in 1936, 46 million yen in 1938, and reached even higher levels in subsequent years. These, however, were not sufficient to alter Japan's status as a substantial net exporter of fishery products.

Exports consisted mainly of canned fish and shellfish, boiled, dried, and salted fish, fish oils (including whale), fish meal, and seaweeds (including tangles, isinglass, and leaver). Canned products (principally salmon, trout, tuna, sardines, and herring) accounted for slightly less than half of the quantity and slightly more than half of the value of total exports. In terms of value set aside and boiled, dried, and salted fish were the next most important items, with fish oils (including whale), fish meal, and fresh and frozen fish accounting for most of the remainder.

The Japanese areas of operation extend from the South China Sea to and including the waters off the coast of Alaska, but are principally in the inshore and offshore waters of Japan and in the Bering Sea and Sea of Okhotsk, off the coast of Siberia. Japanese operations in the Siberian fisheries are carried on under special concessions from the Soviet Union. The rivers, streams and fresh-water lakes of Japan also abound in fish and shellfish; aquiculture is a highly developed industry, the chief products being carp, eels, oysters (including pearl and seed oysters) seaweeds, and goldfish. Whaling operations extended to the Antarctic Ocean; other operations, some experimental, were carried on off the coasts of the United States, Mexico, and Argentina during the last decade.

As operations in and from Japan proper, these activities in the 1930's, together with the preserving and processing plants, required approximately 365,000 vessels, most of which were without engines and under 5 tons. Persons employed number about 1.5 million, about one-half of whom were principally employed in the fisheries and one-half occasionally so employed. In the Japanese colonies and possessions the fisheries used about 70,000 vessels, of which less than 10 percent were equipped with motors. Aquaculture, fishing, and manufacturing employed about 4 million persons. (See tables 1 and 2.)

The Sino-Japanese War, of itself, has had little or no adverse effect upon the fisheries of Japan. Indeed, the 1930's appear to have been the decade of greatest growth and expansion. Although trade with China was adversely affected, this was more than offset by expanding markets in other Far Eastern areas, European countries, and the United States.

But the outbreak of World War II in Europe deprived Japan of its principal export markets for canned fish; and as a result of restrictions by the United Kingdom on imports of canned foods, the United States became practically the only outlet for Japanese canned crab meat. Moreover, as 90 percent of the total Japanese exports of canned salmon and canned trout were normally taken by the United Kingdom (62 percent) and other European countries (28 percent), the cessation of exports to these markets compelled the Japanese to seek other outlets for these products. As the United States is the largest consumer of canned salmon, the Japanese packers proposed to United States packers and dealers in 1940 that Japan export some 680,000 cases of the 1940 pick to the United States for domestic consumption, the exporters to maintain price levels and contribute to the national advertising campaign which had been conducted by the United States industry for several years. The proposal was rejected. It is believed that, except for minor exports to other available markets, the product was consumed in Japan or supplied to its armed forces.

Following the attack on Pearl Harbor and the subsequent declarations of war by the United States and other American nations, Japanese exports to European and Western Hemisphere countries practically ceased. The remaining foreign markets were limited almost wholly to Asiatic countries the normal requirements of which are largely salted and dried fish.

As a result of the drastic shrinkage of export markets after the outbreak of the war in Europe, and in anticipation of their entry into the conflict, the Japanese probably began, in 1940 or earlier, to divert available fishing equipment and personnel to the impending war effort. It is, therefore, reasonable to assume that most of the larger powered fishing vessels, particularly those engaged in production for export, have been converted to plane carriers, transports, supply ships, and other military uses, and that their crews have been diverted to operation of the vessels for these purposes. The principal larger vessels so converted would be whaling ships, floating canneries, and vessels formerly employed in Siberian and Kamchatkan waters.

In the middle 1930's Japan operated 9 floating crab canneries aggregating 37,000 tons, 6 floating salmon canneries totaling 20,000 tons, and 2 whaling factory ships of 27,000 tons and employing 13 killer boats. Antarctic whaling operations subsequently expanded to 6 factory ships of 100,000 tons employing 48 killer boats.

It is probable, also, that many of the smaller powered craft may have been taken for patrol duty and other war services. In 1936 there were 59,000 such vessels of less than 20 tons each, which were engaged principally in the coastal and pelagic fisheries.

The loss of European markets in 1940, Western Hemisphere markets in 1942, and the gradual contraction of Asiatic markets owing to Allied operations in that area, have seriously affected the Japanese fisheries. Furthermore, curtailment of the fisheries have probably reduced the domestic food supply, although it is believed that the Japanese home market is largely dependent upon products of aquiculture and the catches made by the smaller boats making short trips and operating close to shore. In 1936 there were in operation from the ports of Japan proper slightly more than 300,000 nonpowered boats and 59,000 powered vessels of less than 20 tons each (see table 1). These agencies of production are probably adequate for civilian needs alone; but the increased demands of the armed forces for preserved fish (and other preserved foods) have probably created a shortage of civilian supplies.

The problems which the Japanese fisheries industry will face upon the conclusion of the war will be determined almost entirely by (1) the terms of the peace and (2) the extent to which other nations resume trade with that country.

Should Japan be denied the privilege of employing in the fisheries large vessels capable of speedy conversion to military use, the whale fishery and the salmon and crab fisheries operated with floating canneries would be eliminated. Practically the entire production of whale oil is for export and between 80 and 95 percent of the pack of salmon and crab meat is exported. Floating canneries produce from 10 to 20 percent of the total pack of canned salmon and about half of the total pack of canned crab meat. Moreover, should restrictions on the type and size of vessels be extended to include some of the larger trawlers, purse seine vessels, and tuna clippers, the catch of tuna, cod, and certain other so-called deep sea species would be noticeably curtailed.

Japanese operations in the Okhotsk Sea and in the Bering Sea off the coast of Siberia are carried on under agreement between the Governments of Japan and the Soviet Union. These fisheries, together with the floating canneries, are responsible for practically the entire Japanese production of canned crab meat and the bulk of the pack of canned salmon.

Should Japan retain these fishing privileges and be permitted to operate floating canneries after the war, production would probably increase to its prewar volume within a few years. If, however, the Soviet Union should bar the Japanese from these fisheries, and if floating

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canneries are not permitted the Japanese salmon and crab fisheries would be reduced to negligible proportions. Furthermore, should the Soviet Union exclude Japan from their fisheries, the Soviets probably would also repossess Karafuto which, in the past, has been one of the bases for Japanese fishery operations in the Okhotsk Sea.

The loss of Korea, Formosa, and perhaps other island possessions would further restrict and reduce the Japanese fisheries. These colonies, particularly Korea and Formosa, have extensive fisheries of their own. The Japanese Government and Japanese fishing interests have a hand in their development and exploitation; hence, it is believed that Japanese interests and the central government exercise some measure of control over the bulk of the production and trade of the colonies. Furthermore, Japanese vessels operating from Japanese ports exploit the fisheries in some of the colonial areas. About 20 percent of the total Japanese catch of sardines is taken in Korean waters. It is therefore believed that the loss of the colonies would not only materially reduce the Japanese production and trade in fishery products, but private corporations in Japan would lose the bulk of their capital invested in these fisheries.

Thus, restrictions on the size and type of fishing vessels permitted, exclusion from Soviet waters, and the loss of colonies would seriously curtail Japanese operations and production, but the effect would be more pronounced on Japanese production primarily for export, particularly products of the salmon, crab, and whale fisheries.

Should Japan be deprived of the fisheries enumerated above, the most serious consequences would be the loss of products for export. Initially, production for home consumption would register a noticeable decline. However, it is believed that within a relatively short period aquaculture and the fisheries in and around the coasts of Japan proper could be expanded sufficiently to offset the losses resulting from depriving Japan of most of its former colonial and extraterritorial fisheries. Therefore it is unlikely that in these circumstances Japan would be forced to import fish for domestic consumption.

Most of the Japanese exports of canned fish and shellfish is exported to the United States and European countries, principally the United Kingdom. There is also an appreciable market for canned sardines in the Philippine Islands and the British and Dutch colonies in the Far East. Also exported to these and other Asiatic countries are large quantities of dried fish and edible seaweeds. In the postwar period it is anticipated that a great many Asiatic countries, formerly substantial markets for Japanese products, will increase appreciably their production of fishery products for home consumption. Even if such production falls short of normal requirements, it is believed that imports may be sought from other sources before reverting to Japan. This may be particularly true of such countries as China, the Philippine Islands, and the Dutch and British possessions.

The United States and European markets for Japanese canned fish and shellfish may eventually be recovered, provided Japan is left in a position to produce these export products. However, should the Soviet Union repossess Karafuto and take over for its nationals the fisheries formerly operated by Japanese in the Okhotsk and Pering Sons, then markets for canned salmon and canned crab meat would probably be supplied by the Soviet Union instead of Japan.

Marine products exported from Japan supplied substantial amounts of foreign exchange to the country, as production was based almost entirely on domestic raw materials. The severe curtailment of the fishery industry in Japan would deprive the country of one important means of obtaining international credit in the postwar period.

Description and Uses

It is estimated that less than half of the marine products taken by the Japanese Empire fisheries is utilized as food for human consumption. However, food products account for about three-fourths of the value of marine products, as marketed.

The principal non-food products consist of fish oils (including whale), fish meal and fertilizer (including whale). There are also important branches of the industry engaged in such activities as the cultivation of pearl oysters, seed oysters and goldfish, and the manufacture of aquatic leathers (seal, whale, etc.). Seaweeds of various species are used as food for human consumption, for fertilizer, and in the production of fibers, drugs, and cosmetics. The manufacture of buttons from marine shells is also an important industry.

The principal fish caught and used as food for human consumption are salmon, herring, sardines, tuna, bonito, mackerel, cod, bream, trout, and various flatfish such as halibut and flounders. Fish oils and fish meal and fertilizer are manufactured principally from whale, shark, cod livers, herring, and sardines; also utilized for this purpose is most of the waste from the processing plants engaged primarily in the production of food for human consumption.

The most important shellfish are clams, oysters, abalone, cuttlefish, octopus, shrimp, and crabs. Other important products are sea cucumbers and various species of seaweeds.

Aquiculture, which includes fish breeding and artificial culture of pearl oysters, the cultivation of seaweeds, etc., is practiced in pools, reservoirs, rice fields, mountain springs and streams, in natural lakes, and in the brackish water of bays along the sea coast.

The most important products of this fishery are carp, eel, gold fish, and trout from the fresh water lakes, reservoirs, marshes, and streams, and pearl oysters, liver (seaweed), clams, and oysters from the sea water of bays and inlets.

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Organization and Operation

General

The fisheries of the Japanese Empire may roughly be divided into four broad groups: (1) aquiculture, (2) coastal, (3) pelagic or deep sea, and (4) colonial. The importance, in 1935, of operations in and from Japan proper and in the colonies is shown below. (See tables 1, 2, 6, and 8 for more detailed data.)

Area	: Fishing : boats and : vessels	: Persons employed	: Value of catch	: Value of prepared products
	: Number	: Number	: 1,000 yen	: 1,000 yen
Japan proper -----	366,019	1,521,477	346,695	259,289
Colonies -----	78,132	498,789	95,641	86,464
Total Japanese Empire --:	444,151	2,020,266	442,336	345,753

^{1/} Includes 10 percent employed in aquiculture, 72 percent in fishing, and 18 percent in manufacturing.

Aquiculture

The cultivation of fish and other aquatic products has been practiced in Japan for more than 300 years.

Japan has lead the world in fish breeding, the artificial cultivation of pearl oysters, and the cultivation of seaweeds. Aquiculture furnishes direct employment to about 155,000 persons and the products of this branch of the fishery industries has an average annual value of about 25 million yen. (See also Description and Uses).

Coastal fishery

The coastal fishery extends upw rds to 30 miles from shore. Floating equipment consists almost entirely of nonpowered boats and small boats equipped with oil or gas engines. This fishery gives employment to approximately 1-1/4 million persons, or about 80 percent of the total number engaged primarily and secondarily in the fisheries. The annual catch of this fishery is valued at about one-half of the total landings in the country.

The fishing grounds in coastal waters are operated under a license system, and practically every fishing village has its own cooperative society, some of which are affiliated with national or regional federations. These organizations are concerned with cooperative marketing, relief, insurance, and other related matters. (See table 3).

Pelagic Fishery

The pelagic or deep sea fishery, which includes floating canneries, factory ships, and pelagic fisheries in home waters, Korea, Formosa, Karafuto, and the Pacific Islands of Japan, is also operated under a licensing system. Highly capitalized corporations operate these fisheries, with production and exports under Government control or guidance. Practically all producers, processors, and exporters are members of one or more of the various associations or societies, whose primary functions are regulating production, marketing, and prices. (See table 4.)

In the trawl fishery most vessels are equipped with Diesel engines and refrigeration, and have a cruising range up to 10,000 miles. In 1937 there were 94 licensed trawlers operating out of Japan in the following extended areas: East Coast of China and Yellow Sea, 68; Southern China Seas, 18; Bering Sea, 3; Australian coast, 3; and Mexican coast, 2. The catch by this fishery was estimated at 12,000 metric tons valued at 15 million yen.

Japan entered the Antarctic whaling field in 1934. By 1938 three companies operated 6 factory ships totalling 100,000 tons and employing 48 killer boats. The catch of 7,500 males yielded 80,000 tons of oil, all of which was marketed in Europe. Other products of the fishery were marketed in Japan.

The production of canned crab meat is about equally divided between land canneries and floating canneries. In 1938 there were 61 land canneries in operation in Hokkaido (40), Sakhalin (12), and Kamchatka Peninsula (9); and 6 floating canneries aggregating 28,749 tons. ^{3/} The operators of land canneries are members of the Land Canned Crab Packers' Association; the floating canneries form the Canned Crab Manufacturers' Association on Factory Ships; and producers for export are members of the Canned Crab Exporters' Association. These three associations in turn make up the Japanese Canned Crab Packers' and Exporters' Association (see table 4). As the above associations are organized under the provisions of a national fishing law, all pickers and exporters of canned crab meat are compelled to join at least one of the associations. Approximately 90 percent of the total pack of crab meat is exported.

The tuna fishery is operated almost entirely off the east coast of Japan, and around the Bonin and Ryukyu Islands. (See map.) In 1930 there were 1,160 motorized vessels engaged in the fishery. The tonnage of the vessels was as follows:

	Number
Under 20 tons	2,217
20 to 60 tons	759
Over 60 tons	124
Total	3,160

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^{1/} Japan's Fisheries Industry 1939, *The Japan Times and Mail*, p. 68.

^{2/} Ibid., p. 81.

^{3/} According to the Japan-Manchoukuo Year book, 1941, the Japanese fisheries in the Soviet Union are conducted under the terms of the Japan-Soviet Union Fishery Treaty. In 1939 there were 70 crab-fishing grounds assigned to Japanese operators, for which the rental charge was 1,048,000 rubles, and the net or maximum pack permitted was 211,000 cases.

^{4/} *Fishery Industries of Japan*, published by the Canned Foods Association of Japan, 1939, p. 61.

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On the basis of prior changes in the fleet, it may be assumed that since 1930 the total number of vessels decreased, but there has been a substantial increase in the number of vessels of more than 20 tons each.

In 1933 there were 24 tuna canneries operating in 9 "prefectures" of Japan proper; of these 19 were located in 4 prefectures as follows: Shizuoka, 9; Kanagawa, 3; Miyagi, 4; and Chiba, 3. (Approximately 95 percent of the total pack of canned tuna was exported.) ^{1/}

The sardine fishery of Japan proper is conducted almost entirely from small powered and nonpowered vessels ranging up to 20 tons. The annual catch in recent years has averaged 1-3/4 million tons. Japan proper (south coast of Hokkaido and north and east coasts of Honshu) accounts for about 3/4 of the total catch, with Korea (Chosen) and Formosa (Taiwan) supplying most of the remainder. About 70 percent of the catch is used in the production of fish scrap, meal, and oil; most of the remainder is used for human consumption as boiled and dried fish, salted and dried fish, and canned sardines. Less than 5 percent of the catch has, in recent years, been taken by the cannery; but even so small a proportion yielded 2 million cases of sardines in 1937, as against a pack of 110,000 cases in 1930, which reveals the possibilities in the canning industry. In 1930 only three canneries had been established; in 1932 there were 27 canneries in operation, 13 of which were in Hokkaido, 5 in Korea, and 3 in Aomori. Since 1932 the industry has expanded by enlarging these canneries or erecting new plants, or both. Approximately 80 percent of the total pack of canned sardines is exported. ^{2/}

The Japanese salmon fishery extends from Hokkaido northward to and including the Sea of Okhotsk, and the east coast of the Kamchatka Peninsula in the Bering Sea. In 1936 there were 6 floating canneries, aggregating 20,000 tons, operating in the area, with 173 fishing vessels and 3,478 fishermen. The prepared products were valued at nearly 10 million yen of which about 75 percent was canned salmon with frozen and salted fish and fish eggs making up most of the remainder. ^{3/} Floating canneries accounted for only about 10 - 20 percent of the total salmon pack; most of the remainder was canned in Kamchatka. These operations are covered in the description of Japanese operations in northern waters.

What the Japanese designate as Northern waters are described as (1) the Russian territorial fishery, (2) the salmon and crab fishery by the canneries, and (3) the fisheries of the Kurile Islands.

The Russian territorial fishery is conducted under agreement with the Soviet Government, within the territorial waters of that country. Specified grounds are leased ashore, where canning and other establishments are operated. The fishing grounds held under lease and operated by the Japanese numbered a total of about 3,000 miles of Soviet territory. In 1931 the total fishing grounds leased numbered 309, of which 287 were operated; 267 were salmon

^{1/} Fishery Industries of Japan, p. 65.

^{2/} Ibid., pp. 73-83.

^{3/} The Statistical Abstract of the Ministry of Agriculture and Forestry, 1936-37, pp. 158-161.

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fishery grounds, and 20 were crab fisheries. In 1936 the grounds leased numbered 399, of which 376 were operated. In that year the fishery employed 153 vessels of 361,178 tons, and 21,208 fishermen. Prepared products were valued at 35 million yen of which 59 percent was canned salmon, trout, and crab meat, 38 percent salted salmon and trout, and 3 percent other products (including fresh fish, and perhaps fish roe and meal and oil). ^{1/} Recent data are not available on the number of land canneries utilizing the catch. However, in 1932, 22 packers operated a total of 54 salmon canneries; of these, 2 packers operated 33 canneries in Kamchatka, and 20 packers operated 21 canneries in Hokkaido (10), Aomori (9), and Karafuto (2). ^{2/} (See tables 5 and 6 for details of pelagic fisheries in northern waters.)

Data are not available concerning the fisheries of the Kurile Islands. The absence of information and the proximity of the islands to Hokkaido or Kamchatka indicate that preservation of fish in the islands is confined to limited quantities salted and dried, perhaps for local consumption. Hence, most of the catch by vessels operating from these islands might be landed in Hokkaido or Kamchatka. It is believed that these fisheries are financed and perhaps controlled by corporations in Japan proper, and that most of the production used domestic needs is marketed in or exported from Japan proper. It is therefore likely that data on these fisheries are included in the production and trade data for Japan proper.

Colonial fisheries

The colonial fisheries, as reported in official publications, cover Korea, Formosa, Karafuto, and Nampo (South Sea Mandated Islands). In 1935 these fisheries used 78,000 vessels of which only about 5 percent were equipped with engines. Persons employed numbered nearly 1/2 million of which about 20 percent were engaged in aquiculture (Korea and Formosa only), 70 percent in fishing, and 10 percent in manufacturing. (See tables 1 and 2.) The catch was valued at 96 million yen (see table 6) and the prepared products and by-products had a value of 86 million yen (see table 6). The relative importance of the fisheries in each of the four colonies is shown below. (For details concerning the colonial fisheries see tables 1, 2, 6, and 8.)

Colony	Fishing boats and vessels	Persons employed	Value of catch	Value of prepared products
	Number	Number	1,000 yen	1,000 yen
Korea -----	50,331	349,224	68,869	65,014
Formosa -----	10,155	119,371	17,124	2,293
Karafuto -----	17,273	27,858	8,067	46,918
Mandated Islands -----	373	2,356	1,641	2,239
Total -----	78,132	498,789	95,641	86,464

^{1/} The Statistical Abstract of the Ministry of Agriculture and Forestry, 1936-37, pp. 154-157.

^{2/} Fishery Industries of Japan, p. 27.

Information is not available concerning the organization of the fisheries in the colonies. However, on the basis of available information concerning the extent of Government control over production and trade in Japan proper, and the number of societies, federations, and associations which practically blanket the industry, it is reasonable to assume that the same general type of organization, operation, and control exists in the colonial fisheries.

Moreover, as the central Government has encouraged and assisted the development of these fisheries as an integral part of the Empire industry and economy, organization and operation are probably influenced, if not controlled, by the Japanese Government and the larger Japanese corporations engaged in the fisheries.

Production ^{1/}

Fish is a staple food of Japan, the per capita consumption exceeding that of any other country. In 1936 the catch (including shellfish, seaweeds, whales, and the products of aquiculture) amounted to approximately 9.8 billion pounds, which had a value to the fishermen of about 400 million yen. Moreover, the catch (including shellfish, seaweeds, whales, and products of aquiculture) in Korea, Formosa, Karafuto, and the Pacific Islands of Japan, was valued at 111 million yen. (See tables 7 and 8.)

It is estimated that less than half of the total marine products taken are utilized as food for human consumption; most of the remainder, together with wastes from the processing plants, is used in the manufacture of oil, meal, and fertilizer. However, food products accounted for about three-fourths of the value of production, as marketed. The food products prepared in 1936 (excluding fresh and frozen fish and shellfish) were valued at 243 million yen. In addition, the prepared food products of Korea, Formosa, Karafuto, and the Pacific Islands of Japan were valued at 43 million yen in 1935, the latest year for which statistics are available. (See table 6.)

The preservation of fish by steaming, drying, boiling and drying, and salting, like the preparation of fish pastes, is an old industry in Japan, but canning and freezing are relatively new developments. Salmon and crab meat were the first products to be canned extensively. Later, tuna, eel, trout, mackerel, and sardines were canned in generally increasing quantities. Indeed, since about 1927 the canning of fish and shellfish has shown greater expansion than any other important division of the fisheries industry. In that year total production amounted to 2 million cases valued at 47 million yen, in 1937 the pack was 8 million cases valued at 140 million yen. Practically the entire canning industry is dependent upon export markets, principally European and Western Hemisphere countries. The bulk of the food products preserved by other methods are for home consumption. There is, however, a considerable market for salted and dried products in other Oriental countries.

^{1/} For purposes of comparison see section on exports for details of production primarily for export.

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The data given above are based upon official statistics of production and manufacture, and trade publications dealing with various branches of the fisheries industry. Consequently some of the figures dealing with total catch and manufactured products cannot be reconciled to the official statistics given in tables in the Appendix. It is believed, however, that official data in the Appendix tables, particularly with respect to certain processed products, underestimate the total production. For example, in Fishery Industries of Japan, published jointly by 6 of the leading fish-processing and exporting associations, the total pack of canned crab meat in 1934 was reported to be 461,639 cases. But according to official statistics published in The Statistical Abstract of The Ministry of Agriculture and Forestry, 1936-37, the pack was only 417,771 cases. It is believed that the former figure more accurately represents the total pack. It includes the quantities packed in Korea and Karafuto which probably were not incorporated in the value of food products manufactured in those areas.

Moreover, the Japanese official publications show the extent of "Pelagic fisheries" in Korean, Formosan, and Kwantung waters. In 1935 these fisheries employed 1,290 boats and vessels and 9,284 fishermen not domiciled in those areas. The total catch amounted to 116 million kilograms valued at 5 million yen. (See tables 2, 7, and 8.) It is believed that these fisheries are owned and operated by corporations and individuals in Japan proper and that the products of the fishery are brought to that country. However, in view of the fact that the fishing fleets employed in these waters consist almost entirely of small vessels (a great many without engines), the catches may have been landed in Japan by transport vessels clearing from ports in the fishing areas; and in view of distances from some of these areas to Japanese ports, it is not unreasonable to assume that a part of the catch was processed in these territories before being brought to Japan. Because of proximity to the Japanese mainland, a large part of the catch in Korean waters may have been landed fresh in Japan for consumption as landed or as raw material for the processing and preserving plants.

Imports

Foreign

Japanese imports of fishery products from foreign countries (including Manchuria and Kwantung) are negligible compared to production and exports. Slightly more than half of the total imports have been food for human consumption and consisted of salted fish, principally from the Soviet Union and Canada, fresh and frozen fish from the Soviet Union, PURL: <http://www.digitopis.org/doc/db1413/> the United States. Nonedible products imported consisted largely of mollusk shells, tortoise shells, sponges, and fish guano. Mollusk shells, principally from China and Kwantung, and tortoise shells, principally from the Straits Settlements and the Netherlands Indies, are used largely in the manufacture of buttons, optical goods, and novelties. Sponges, almost entirely from the United States and the Bahamas, are used primarily in the bath and for certain industrial purposes. The value of imports in selected years is given below. (For details see table 9.)

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(In thousands of yen)

Type of product	1928	1930	1933
Fish and shellfish (except salted fish) -----:	1,747	1,411	468
Fish, salted -----:	3,242	1,449	1,174
Other marine products (shells, sponges, fish guano) -----:	3,665	4,729	1,687
Total -----:	8,654	7,589	3,329
-----:	-----:	-----:	-----:

Source: Annual and Monthly Returns of Foreign Trade of Japan.

Since Japan entered the war imports from foreign countries of fishery products for food have practically ceased. Those from the Soviet Union (the principal source) declined to insignificant quantities after 1934 and those from the United States and Canada (the next most important sources) were eliminated following the Japanese attack on Pearl Harbor. However, their loss had little or no effect upon the domestic food supply because of the tremendous domestic production and the sharp decline in exports. But the button, optical, and novelty industries are partially dependent for raw materials upon imports of mollusk shells from China, Kwantung, and Manchuria, and tortoise shells from the Straits Settlements and Netherlands Indies. As Japan has no sponge fishery, imports--formerly from the United States and the Bahamas--have been replaced, where possible, by substitute materials.

Colonial

Of considerably more importance to the Japanese economy than imports of marine products from all other foreign sources are those from Korea, Formosa, Karafuto, and the Pacific Islands of Japan. (See tables 9 and 10.) The fisheries in these colonial possessions of Japan are controlled to a large extent by the central Government, and it is highly probable that most of the larger fisheries concerns are branches or subsidiaries of corporations with headquarters in Japan, or independent concerns closely affiliated with Japanese corporations.^{1/} Moreover, the fact that exports of fishery products to Japan proper from these possessions greatly exceed their exports to all other countries indicates export control by either the Japanese Government, the industry, or both.

During the 5 years ended 1940 the annual imports of fishery products (excluding fish oils) from Korea averaged about 400 million kin valued at 53 million yen. Approximately 25 percent of the quantity and 30 percent of the total value consisted of fish and shellfish for food. Fish refuse accounted for 55 percent of the quantity and 30 percent of the value of total imports. (See table 10 for detailed statistics in selected years.)

^{1/} According to the Japan-Manchukuo Yearbook, 1940, the fisheries of Korea were conducted by 50 companies with an authorized capital of 305 million yen; 6 companies capitalized at 292 million yen maintained headquarters in Japan proper, while 44 companies with a total capital of only 13 million yen were Korean concerns.

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The average annual value of imports from Formosa during the 5 years ended 1938 was 3 million yen. (See table 9 for statistics in selected years.)

Statistical data are not available covering imports of fishery products from Karafuto and the Pacific Islands into Japan proper. It is believed, however, that the commercial fisheries of both of these possessions have been developed with Japanese capital and that operations are pretty generally under the control of the Japanese Government and Japanese fishery interests.

In Karafuto the fisheries rank third in classified industries, with an annual production value (including manufactured products) of approximately 17 million yen. Prepared products consist almost entirely of canned fish and shellfish, salted and dried fish, isinglass, manure (fertilizer), and fish oils. With a population of only about 330,000, only a negligible part of the total production is retained for domestic consumption, and most of the remainder is shipped to Japan proper for consumption there or for export to foreign countries. As Japan proper has an exportable surplus of practically all fishery products produced in Karafuto, it is reasonable to assume that most all of the fishery products of Karafuto are exported. This is particularly true of canned fish and shellfish, as from 75 to 90 percent of the Japanese production of these commodities is exported. Moreover, in most Japanese trade statistics the exports of Karafuto are included with those of Japan proper.

In the Pacific Islands of Japan, the fisheries ranked second in industrial importance in 1936 with a catch valued at 3.6 million yen (see table 8) and manufactured products valued at 2.8 million yen (see table 6). According to available information both fishing and processing have expanded considerably since 1936. The catch is confined largely to bonito and marine shells, and manufactures are almost entirely dried bonito and dried tuna. As the Japanese are large consumers of dried fish, it is probable that most of the production of the Pacific Islands has been exported to Japan for consumption there. Marine shells probably have been shipped to Japan for processing.

The fisheries of these Japanese possessions have shown a marked and steady increase during the 1930's. Influencing factors were the general expansion of Japanese fisheries operations, particularly during the 1920's and 1930's, and the widening distribution and increasing volume of Japanese exports to foreign countries. In extending operations the central Government was primarily responsible for the establishment of regulations calculated to develop the fisheries resources. Improved fishing and preserving methods were introduced. Some operations have received subsidies from the local Government, and the Japanese Government has encouraged the operation of powered vessels in some of the fisheries.

PURL: <http://www.legal-tools.org/doc/db1413/>

In all of these possessions the export trade in fishery products has been of considerable importance in their economy; and the political and economic tie-up with Japan proper influenced—if it did not control—this trade. This perhaps in no small measure accounts for the fact that the colonies' exports to Japan proper greatly exceeded exports to other countries.

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Exports

General

Japan has been the world's largest producer of fish and fish products, and though the per capita consumption has exceeded that of any other country, there has been a large surplus wholly dependent upon foreign markets. During the 5 years 1933-37 the total Japanese domestic exports (excluding exports to Korea and Formosa) had an average annual value of 2,441 million yen. Yarns and piece goods of cotton, silk, rayon, and wool accounted for approximately half of the total. Fish and fish products (food, oil, meal, fertilizer, etc.), although only about 5 percent of the total, were the next most important group of closely related items or commodities. Three-fourths of these exports consisted of food for human consumption. Moreover, fishery products exported were prepared almost entirely from domestic raw materials.

The Japanese export trade in fishery products began with shipments to China of dried and salted fish and shellfish, and until shortly after the turn of the century these products constituted the bulk of the total exports of fishery products from Japan.

During the decade ended 1939 this trade was maintained under increasing difficulties, and it practically ceased with the spread of World War II to those countries. In the interim, however, the Japanese had been expanding their export markets in other Asiatic countries. This period also marked the expansion of fishing activities generally and the development of new industries, the most important of which were canning, freezing, the manufacture of oils and meal, floating canneries for salmon and crabs, and floating factory ships in the whale fishery. These activities were undertaken primarily with the view to promoting export trade in fishery products by expanding existing markets and developing new ones.

The success of these enterprises is illustrated by comparing the value of exports in 1920 and in 1936. They were as follows:

Type of product	1920		1936	
	Value	Percent	Value	Percent
	<u>1,000 yen:</u>		<u>1,000 yen:</u>	
Fish and shellfish:				
Fresh or frozen	1,224	4.4	3,776	3.6
Canned	5,954	21.2	59,756	56.5
Dried, boiled, salted, etc.	11,851	42.2	14,613	13.8
Other marine products:				
Coral	128	.5	217	.2
Meal, fish	1/		7,434	
Oil, fish, including whale 2/	3,389	12.1	10,180	9.9
Seaweed:				
Isinglass, vegetable	1,428	5.1	5,574	5.3
Other seaweed	4,072	14.5	4,149	3.9
Total	28,046	100.0	105,699	100.0

1/ Not separately reported prior to 1935.

2/ Fish oil is not included in certain other tables, notably table 11, in this study.

Source: Annual Return of Foreign Trade of Japan.

The figures for 1936 exclude canned fish produced by Japanese canneries in Kamchatka and whale oil produced in the Antarctic. These products have an estimated annual value of 17 million yen and 14 million yen, respectively. They are shipped direct from the fishing areas to European markets and are not included in the trade returns compiled by the Finance Ministry. ^{1/}

Japanese exports to Formosa averaged slightly more than 9 million yen annually during the years 1928-38 (see table 11) which was about three times the value of Japanese imports from Formosa (see table 9). Japanese export trade with Korea, although having an annual value of from 4 to 8 million yen, represented only about 10-20 percent of the value of Japanese imports from that country (see tables 9 and 11). This Japanese export trade is not included in export statistics subsequently referred to.

Exports of fish and fishery products from Japan may be divided into two broad groups: (1) Those generally taken by oriental countries and countries within the Japanese sphere of influence or domination; and (2) those that find markets in occidental countries, particularly the United States, the United Kingdom, and other European countries. The first group consists largely of dried and salted fish and shell fish, canned sardines, and processed seaweeds; the second is predominantly canned fish and shellfish, but of considerable importance are frozen fish, fish meal, and fish oils (including whale).

Total exports of marine products by principal products, including exports to Korea and Formosa, in specified years are shown in table 11. Excluded therefrom are exports of fish oils (including whale) which are covered in another trade study. ^{2/} Also excluded are canned fish and shellfish exported from Kamchatka by Japanese operating in that area which are not reported in official statistics. Other items of minor importance, not separately reported, were forgo omitted, but it is believed that these omissions are insignificant in volume and value.

There follows a detailed statement concerning the more important products exported and the principal markets for them.

Fresh and frozen fish and shellfish

Japanese exports of fresh and frozen fish and shellfish represented a minor part of the total export trade in marine products. Individually, however, they were significant in that the principal commodities were confined to a limited number of markets. About 75 percent of the oysters have been seed oysters exported to the United States for transplanting in Pacific coast

^{1/} *Marine Products for Export*, by Motozo Ezoe, Adviser to the Sea Product Work, the Fisheries Bureau, The Agriculture and Forestry Ministry, published in *Japan's Fisheries Industry*, 1932, The Japan Times and Mail, pp. 92-94. [PURL: http://www.legal-tools.org/doc/db1413/](http://www.legal-tools.org/doc/db1413/)

^{2/} Cragg, Rollin H., U. S. Tariff Commission, *Fats, oils, and oil-bearing Materials*, Japanese Trade Study, Special Industry Analysis No. 15, May 1949.

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Following the attack on Pearl Harbor and the subsequent declarations of war by the United States and other American nations, Japanese exports to both European and Western Hemisphere countries ceased. The remaining foreign markets are limited almost wholly to Asiatic countries, the requirements of which are largely salted and dried fish.

Little information is available regarding Japanese canned salmon operations since that country entered the war. Practically the entire fishing and canning operations (including floating canneries) are north of Japan proper, extending from Hokkaido into the Sea of Okhotsk and the Bering Sea. Most fishing operations are carried on in Soviet territorial waters and more than half of the Japanese land canneries are located in Soviet territory, principally Kamchatka. These operations are under a Soviet-Japanese agreement which stems from the Treaty of Portsmouth, effective October 16, 1905. The agreement was renewed every 5 years until 1937 when the Soviet Government limited renewals to one year's duration. However, on March 30, 1944, it was again renewed for a 5-year period. The increase in fees to be paid to the Soviet Government by the Japanese Government under the new agreement for fishing sites and other concessions, as well as modifications and restrictions favorable to the Soviet Union, indicate that the Japanese Government was anxious to renew the agreement for a period extending beyond the probable duration of the war. It may be assumed that the Japanese prosecuted this fishery to the limits permitted under war conditions, as a means of maintaining an adequate supply of protein foods for home consumption. For fishing in this area was--at least until 1945--practically free from interference by naval action, whereas operations farther south were too hazardous for the larger vessels (if any) still engaged in other fisheries. Furthermore, since the loss of export markets, probably most of the catch is preserved by salting rather than canning because the former method is more economical and the product is more likely used in Japan than canned fish. This shift in method of preservation could have been accomplished without great difficulty because appreciable quantities of salmon have always been salted in the area for consumption in Japan. Therefore, conversion would entail only an expansion and extension of established facilities, in which present cannery buildings could be utilized.

Postwar operations in the Japanese canned salmon industry will be almost entirely dependent upon Soviet-Japanese relations and the extent to which Japan may be able to restore extensive floating equipment essential to a successful prosecution of the fishery.

This fishery is of tremendous economic importance to the countries operating it. In 1931 there were 557 salmon fishery grounds in the area which Japan operating 283 and the Soviet Union 269; in 1939 there were 700 fishery grounds, the Japanese operating 339 and the Soviet Union 361. Since the Soviet Union has entered the war against Japan, Japanese operations

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ception of hostilities, sardine canning will be one of the first plowing industries to stage a recovery, provided former export markets are receptive.

It will be noted that the predominant markets for these products are the Philippine Islands and British and Dutch possession in Asia. It is very likely that, during the few years immediately following the termination of hostilities, Japanese products will be anathema to the inhabitants of these countries. In the interim the principal other source of supply will probably be the United States, which normally has a large exportable surplus of canned sardines of the type and grade packed in Japan. These products are California pilchards packed in 1-round oval cans in tomato sauce or the natural oil of the fish. In 1929 total United States exports of canned sardines amounted to 124 million pounds valued at 9.4 million dollars, with the Philippine Islands taking 16 percent of the total and 37 percent going to British India, British Malaya, Ceylon, Hong Kong, and Netherlands Indies; in 1939 total exports were only 57 million pounds valued at 3.0 million dollars, the Philippine Islands taking 26 percent and the other unenumerated countries, only 12 percent. The decline in exports to these markets was due almost entirely to steadily increasing supplies from Japan which were sold at prices slightly below those obtaining for the similar product of the United States.

With public sentiment in these consuming centers perhaps favoring products of the United Nations, the United States producers may have, upon the conclusion of the war in the Pacific, an opportunity to recapture and expand these markets provided low cost production is feasible and prices do not greatly exceed those asked for the Japanese product.

The Japanese, on the other hand, will use every effort to recover these markets, for on them depends the maintenance of the sardine-canning industry. About 80 percent of the Japanese production is exported and exports in recent years were valued at 5 to 10 million yen annually. If it has been proposed, Japan loses Korea and Formosa after the war, Japanese fishing activities in the waters of those countries will likely be curtailed if not eliminated entirely. The industry will also lose the canneries operating in Korea. Thus the Japanese catch of sardines would be reduced--at least temporarily--by about 20 percent. It does not necessarily follow, however, that production of canned sardines would be materially affected, for only about 5 percent of the normal catch has been taken by the canners, the remainder being used in the manufacture of meal and oil and the production of dried and salted fish for human consumption. Therefore, despite reduced catches, sardine canning could be restored to pre-war levels by diverting a slightly larger share of the catch to the canners.

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The fish meal industry in Japan is capable of tremendous expansion, and the organization of the Association and the assumption of Government control of exports indicate that production would be increased to the extent that export markets could be found for the product. But the war has closed practically all export markets and although little is known of the industry as presently operated, it is believed that even if the normal catch of sardines and herring (principal raw material for fish meal) has been maintained, the increasing need for fish as food for human consumption takes precedence over utilization of the catch for the production of meal and oil. Hence, it is probable that production of meal and oil has shown a decided slump. However, if equipment and facilities are available after the war, production can quickly be restored to, or even expanded beyond, prewar levels.

Both as a fertilizer and as protein feed for animals and poultry, fish meal will be an important item in the restoration of devastated agricultural sections of Europe. It is likely that some supplies will be available from Iceland, Newfoundland, and perhaps Canada and the United States. However, the United States has been on a pronounced import basis and until the war practically all Canadian exports went to the United Kingdom and the United States.

In the face of a deficiency which will exist in European countries during the early postwar years, there should be a foreign market for all fish meal the Japanese are able to produce for export, provided the European countries are not averse to the products of Japan.

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Table 1.- Japanese Empire fisheries: Fishing boats and vessels, and persons employed, in specified years, 1928 to 1936

Item	1928	1934	1935	1936
	Number	Number	Number	Number
Fishing craft				
Japan proper: 1/				
Boats and vessels:				
Without engines:				
Under 5 tons	326,500	303,342	300,651	296,796
5 tons and over	8,181	8,211	7,890	7,800
Total, without engines	334,681	311,553	308,541	304,096
With engines:				
Steam:				
Under 50 tons	19	63	116	24
50 tons and over	90	24	56	57
Total, steam	109	87	202	100
Oil:				
Under 20 tons	23,981	50,549	54,653	59,227
20 tons and over	1,355	2,393	2,623	2,836
Total, oil	25,336	52,942	57,276	62,063
Total, with engines	25,445	53,029	57,478	62,169
Total, Japan proper	360,126	364,582	366,019	366,267
Colonies:				
Boats and vessels:				
Chosen (Korea):				
Without engines	35,794	41,311	48,921	3/
With engines	543	1,323	1,410	2/
Taiwan (Formosa):				
Without engines	10,667	3,519	9,181	2/
With engines	678	848	974	2/
Karafuto, total	11,255	17,363	17,273	15,047
Nanyo (South Sea Mandated Islands):				
Without engines	2/	316	265	237
With engines	2/	93	106	216
Total, Colonies	3/	64,773	76,132	3/
Total, Japanese Empire	3/	429,355	444,151	3/
Persons employed				
Japan proper: 1/				
Aquiculture	118,875	151,007	155,203	154,627
Fishing	1,130,430	1,103,346	1,096,999	1,102,502
Manufacturing	248,953	267,363	267,275	277,303
Total, Japan proper	1,496,258	1,521,916	1,521,477	1,534,432
Colonies:				
Chosen (Korea):				
Aquiculture	65,603	76,663	82,783	2/
Fishing	321,787	234,771	242,220	2/
Manufacturing	38,604	27,649	24,221	2/
Total, Chosen	425,994	339,083	349,224	2/
Taiwan (Formosa):				
Aquiculture	53,072	26,919	27,047	2/
Fishing	136,637	86,989	87,717	2/
Manufacturing	5,376	4,463	4,607	2/
Total, Taiwan	195,085	118,371	119,371	2/
Karafuto, fishing, total	20,565	25,000	25,000	2/
Nanyo (South Sea Mandated Islands), fishing, total	2/	2,236	2,356	3,100
Total, Colonies	3/	485,497	498,789	3/
Total, Japanese Empire	3/	2,007,413	2,020,266	3/

1/ Includes aquiculture and coastal and pelagic fisheries.

2/ No data available.

3/ Incomplete.

Table 3.- Japanese fisheries: Societies and federations of the industry, in Japan proper, 1928 and 1935

Item	1928		1935	
	Number	Number	Number	Number
<u>Aquatic Products Societies and Federations:</u>				
<u>1/</u> Societies	46		66	
Members of societies	52,480		45,961	
Federation of societies	12	1	1	
Member-societies of federation	3		3	
<u>Fishermen's Societies and Federations:</u> 2/				
Societies	3,870		4,000	
Members of societies	509,863		580,103	
Federations of societies	48		74	
Member-societies of federations	636		941	
<u>Fishery Societies:</u> 3/				
Societies	371		324	
Members of societies	440,883		444,472	
<u>Totals:</u>				
Societies	4,287		4,810	
Members	1,003,226		1,069,539	
Federations	49		75	
Member-societies of federations	639		944	

1/ Corporations organized by fishermen and aquatic producers to improve the general condition of the fisheries as well as to promote mutual benefits.

2/ Corporations organized by fishermen to obtain fishing rights and piscary as well as to establish common working orders.

3/ Corporations organized by fishermen, aquatic producers, and dealers to improve the general conditions of the fisheries.

Source: The Statistical Abstract of the Ministry of Agriculture and Forestry, Tokyo, Japan.

Table 11.- Marine products:^{1/} Exports from Japan to all areas,
in specified years, 1928 to 1938

Item	1928	1932	1936	1938
	Quantity (100 kg.)			
	2/	2/	2/	2/
Formosa:				
Fish, shellfish, mollusks, and other aquatic products				
Korea:				
Fish:				
Dried	86,196	118,322	147,399	100,258
Salted	72,686	44,918	182,059	201,347
Other	26,630	39,344	112,586	117,262
Seaweed, including tangles	22,076	15,267	22,360	44,489
Total Korea	207,588	217,851	464,604	465,356
Other countries:				
Fish and shellfish:				
Fresh or frozen 2/	66,420	70,233	180,978	280,435
Canned:				
Fish	54,755	319,435	1,220,237	1,523,000
Shellfish	239,836	147,633	204,550	187,619
Dried or boiled and dried	281,106	115,433	273,933	146,233
Salted	76,003	39,867	251,208	278,719
Other marine products:				
Meal, fish	466,523	466,590	1,124,739	675,050
Seaweed (isinglass, laver, tangles)	236	97	605,187	432,377
Shells and coral			129	19,145
Total other countries	1,184,879	1,339,288	3,860,961	3,542,578
	Value (1,000 yen)			
Formosa:				
Fish, shellfish, mollusks, and other aquatic products				
Korea:				
Fish:				
Dried	9,292	6,934	8,730	9,305
Salted	1,554	1,528	2,722	2,395
Other	817	330	1,326	2,102
Seaweed, including tangles	868	835	1,987	3,294
Total Korea	387	351	549	951
Other countries:				
Fish and shellfish:				
Fresh or frozen 2/	3,626	3,044	6,584	8,742
Canned:				
Fish	1,689	1,396	3,776	6,697
Shellfish	1,536	8,749	41,430	54,514
Dried or boiled and dried	18,573	10,750	18,326	17,086
Salted	11,643	3,724	12,040	8,456
Other marine products:				
Meal, fish	712	386	2,573	3,332
Seaweed (isinglass, laver, tangles)				
Shells and coral	7,262	5,408	9,723	9,630
Total other countries	218	68	217	1,586
Grand total	41,833	30,481	95,519	106,483

^{1/} Does not include fish oils (including whale) which are covered in a trade study entitled Fats, Oils, and Oil-Bearing Materials. (See p. 14.) Also excluded are canned fish and shellfish exported directly from the Kamchatkan fisheries operated by Japan and not reported in official statistics.

^{2/} Value only given.

^{3/} Excludes goldfish and fish livers, which in 1939 were valued at 10,000 yen and 6,047,000 yen, respectively.

^{4/} Not separately reported.

Source: Annual Return of the Trade of Formosa; Tables of the Trade and Shipping of Korea; and Annual and Monthly Returns of Foreign Trade of Japan.

Table 12.- Fish and shellfish, fresh: ^{1/} Exports from Japan,
to principal markets, by types, in specified years,
1928 to 1938

Year and item	United States ^{2/}	China ^{3/}	Kwantung	Other countries	Total
Quantity (100 kin)					
1928:					
Fish and shellfish	34,977	18,939	10,764	1,740	66,420
1932:					
Fish and shellfish	31,560	8,426	25,335	4,906	70,233
1936:					
Bonito and tuna	21,198	95	7,207	5	28,505
Oysters	31,599	125	48	155	31,927
Other fish and shellfish	75,293	6,486	37,154	1,613	120,546
Total	128,090	6,706	44,109	1,773	180,978
1938:					
Bonito and tuna	35,716	7,755	4,787	593	48,851
Oysters	2,020	130	16	-	2,166
Scallops (hotatekai)	4,636	581	5	313	5,535
Other fish and shellfish	57,167	97,955	66,564	1,797	223,882
Total	94,939	106,421	71,372	2,703	280,435
Value (1,000 yen)					
1928:					
Fish and shellfish	1,094	475	279	41	1,889
1932:					
Fish and shellfish	683	199	357	157	1,396
1936:					
Bonito and tuna	387	2	227	4/	616
Oysters	324	1	4/	1	326
Other fish and shellfish	2,081	86	609	58	2,834
Total	2,792	89	836	59	3,776
1938:					
Bonito and tuna	696	185	131	21	1,033
Oysters	24	1	4/	-	25
Scallops (hotatekai)	223	20	4/	10	253
Other fish and shellfish	2,034	2,172	1,082	98	5,386
Total	2,977	2,378	1,213	129	6,607

^{1/} Does not include fish livers which were not separately reported prior to 1939. During that year the exports of fish livers were 4,167,000 kin valued at 6,047,000 yen almost all going to the United States.

^{2/} Includes negligible exports to Hawaii.

^{3/} Includes insignificant exports to Manchuria.

^{4/} Less than 500 yen.

Source: Annual and Monthly Returns of Foreign Trade of Japan.

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Table 14.- Crabs in tin: Exports from Japan to principal markets, in specified years, 1928 to 1938 ^{1/}

Country of destination	1928		1932		1936		1938	
	Quantity 10,000 kin	Value yen	Quantity 100 kin	Value yen	Quantity 100 kin	Value yen	Quantity 100 kin	Value yen
United States	134,641	10,488	60,758	4,534	82,217	8,391	68,918	7,515
France	4,629	340	19,772	1,369	6,740	778	1,351	127
United Kingdom	16,811	5,977	40,628	3,653	57,421	5,740	46,350	4,786
Manchuria	2/	2/	7	3/	226	14	336	26
Other countries								
Total	239,336	18,573	147,633	10,750	171,382	7,200	144,514	15,244

^{1/} Does not include exports of the Japanese fishery operating in Kamchatka.^{2/} Not separately reported.^{3/} Less than 50 yen.

Source: Annual and Monthly Returns of Foreign Trade of Japan.

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Table 15.- Sardines in tin ^{1/}: Exports from Japan, to principal markets, 1936 and 1938

Country of destination	1936		1938	
	Quantity 10 ³ kin	Value 10 ³ yen	Quantity 10 ³ kin	Value 10 ³ yen
America:				
Brazil	17,151	470	15,731	257
Germany	-	-	301	7
Greece	-	-	348	28
United Kingdom	37,055	262	17,880	329
Africa:				
Egypt	2,347	50	4,716	95
Asia:				
British India	74,399	1,107	1,452	24
Burma	-	-	38,358	521
China	586	10	13,261	302
Kwangtung	3,568	56	13,133	276
Manchuria	1,233	19	7,798	166
Netherlands Indies	98,406	1,417	94,011	1,541
Philippine Islands	110,022	1,586	74,462	1,291
Straits Settlements	68,625	990	16,372	292
Other countries ^{2/}	105,504	1,715	27,339	2,396
Total	499,311	7,482	425,034	7,544

^{1/} Includes sardines packed in oil and in tomato sauce and in other sauces and oils.

^{2/} Includes some countries in the above continent groups.

See: Annual and Monthly Returns of Foreign Trade of Japan.

Table 18.- Fish and shellfish, dried, or boiled and dried: Exports from Japan to principal markets, in specified years, 1928 to 1938

Country of destination	1928		1932		1936		1938	
	Quantity 100 kin	Value 1,000 yen						
United States 1/	23,262	1,135	18,950	584	13,576	484	11,302	683
China 2/	32,823	2,346	22,892	763	61,540	2,709	43,663	1,985
Hong Kong	163,495	5,083	17,530	546	61,978	2,257	3,632	130
Kwantung	9,965	981	23,406	879	37,208	2,198	56,949	4,260
Manchuria 3/	3/	352	19	3,510	129	9,475	404	
Netherlands Indies	113	1.	452	32	488	52	164	11
Philippine Islands	5,694	171	8,802	113	26,619	480	8,902	246
Straits Settlements	23,203	768	4,901	174	45,106	2,385	597	39
Thailand	1,005	45	5,061	134	2,727	154	173	14
Other countries	21,522	1,084	13,087	489	21,181	1,192	11,386	684
Total	281,106	11,645	115,433	3,721	273,955	12,040	146,233	8,456

1/ Principally Hawaii.

2/ Includes Manchuria.

3/ Included with China.

Source: Annual and Monthly Returns of Foreign Trade of Japan.

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Table 7.- Caustic soda: Exports from Japan, to Empire and to non-Empire areas,
1928-39 and averages, 1928-33 and 1934-38

Year	To Empire areas					To non-Empire areas								Total	
	Manchuria	Kwantung	Korea	Total	Norway	Netherlands Indies	Netherlands	Brazil	China	Argentina	Belgium-Luxemburg	British India ^{1/}	Other		
Quantity (metric tons)															
1928	2/	2/	3,028	3,028	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1929	2/	2/	3,277	3,277	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1930	2/	2/	4,263	4,263	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1931	2/	2/	5,107	5,107	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1932	2/	2/	3,140	3,140	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1933	2/	2/	3,425	3,425	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
Average, 1928-33	-	-	3,723	3,723	-	-	-	-	-	-	-	-	-	-	
1934	188	758	4,145	5,091	-	2,607	-	150	4,856	1,027	-	1,515	1,192	11,347	16,238
1935	732	1,428	4,123	6,283	228	3,629	706	792	3,362	1,168	1,121	1,633	2,697	15,336	21,619
1936	771	734	3,912	5,419	508	2,250	2,064	1,084	2,584	1,878	1,249	1,991	8,719	22,407	27,822
1937	567	559	4,515	5,641	727	599	443	324	119	315	174	162	1,556	4,439	10,080
1938	3,208	1,726	6,629	11,563	-	65	-	-	6,581	-	-	5/	35	6,681	18,244
Average, 1934-38	1,093	1,011	4,665	6,799	297	1,830	643	470	3,496	877	529	1,060	2,840	12,027	18,821
1939	5/	5/	8,857	8,857	5/	6/	6/	6/	6/	6/	6/	6/	6/	24,283	33,140
Value (1,000 yen)															
1928	2/	2/	724	724	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1929	2/	2/	740	740	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1930	2/	2/	902	902	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1931	2/	2/	821	821	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1932	2/	2/	571	571	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
1933	2/	2/	835	935	2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
Average, 1928-33	-	-	765	765	-	-	-	-	-	-	-	-	-	-	
1934	34	131	963	1,128	-	439	-	30	781	162	-	251	197	1,960	2,988
1935	114	207	935	1,256	36	520	106	131	507	170	208	261	425	2,364	3,620
1936	93	89	678	860	63	264	238	142	283	207	173	268	1,056	2,694	3,554
1937	102	83	932	1,117	92	84	47	41	15	35	20	22	200	556	1,673
1938	726	390	1,665	2,781	-	9	-	-	1,498	-	-	1	7	1,515	4,296
Average, 1934-38	214	180	1,034	1,428	38	263	78	69	617	115	80	161	377	1,798	3,226
1939	5/	5/	2,037	2,037	5/	6/	6/	6/	6/	6/	6/	6/	6/	6,032	8,069

1/ Not separately classified. Included in "other drugs, chemicals, etc."

2/ Includes Burma prior to 1938.

2/ Not separately classified in export statistics of Japan prior to 1934.

2/ Not available.

2/ Less than one-half metric ton.

5/ Quantity detail not available.

Source: Compiled from official statistics of Japan, Formosa, Korea, and Mandated Islands; and from Annual and Monthly Returns of Foreign Trade of Japan.

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Consumption of soda ash has exceeded production by a slight amount in each year during the period 1934-39 whereas the consumption of caustic soda, on the other hand, has been slightly less than production.

For such years as data are available, apparent consumption both of soda ash and of caustic soda are shown in table 3 together with the ratio of apparent consumption to production.

Table 3.- Soda ash and caustic soda: Consumption, production, and ratio of consumption to production, 1934-39

Year	Soda ash				Caustic soda			
	Ratio of con- sumption to production		Ratio of con- sumption to production		Ratio of con- sumption to production		Ratio of con- sumption to production	
	Metric tons	Metric tons	Percent	Metric tons	Metric tons	Percent	Metric tons	Metric tons
1934	190,683	170,622	111.6	171,261	177,771	96.3		
1935	370,274	364,613	101.6	231,605	353,283	99.3		
1936	378,013	367,205	102.9	268,760	384,990	97.3		
1937	406,543	378,229	107.5	379,490	362,141	104.8		
1938	252,402	242,885	103.9	231,296	440,760	77.9		
1939	307,763	295,000	104.3	393,598	423,000	93.0		

Source: Tables 1 and 2.

Domestic problems.

Both soda ash and caustic soda in Japan are made from salt—the soda ash directly, and the caustic soda both directly by the electrolysis of brine, and indirectly by the causticization of soda ash. At least half of the soda ash produced in Japan is converted to caustic soda; and the caustic soda thus produced from soda ash accounts for more than half of Japan's total production of caustic soda. Imports of the finished products are small, with production accounting for over 90 percent of the quantity produced for home consumption and for export. The industry, therefore, is based on the consumption of salt.

Japan, however, does not produce sufficient salt to satisfy its industrial requirements and has imported heavily. The cost per cromium, therefore, underlying Japan's production of soda ash and caustic soda is the import cost of salt. The extent to which Japan is dependent on imports to satisfy its industrial requirements for salt is covered in detail in the trade study relating to that commodity. There appears to be no need for limiting directly the amount of caustic soda or soda ash produced in Japan.

A-23

Calcium cyanamide is a crystalline product made from calcium carbide and nitrogen and contains, in commercial grades, approximately 20 percent of nitrogen. Although it is used principally as a fertilizer material, it has certain industrial applications. In Japan, in addition to its use as a fertilizer material, a certain amount is regularly converted to ammonia, and a considerably smaller amount is converted to urea, which has both industrial and agricultural uses.

From the above, it is evident that a considerable amount of interchangeability or substitution of one of these commodities for another is both possible and customary. It is also evident that there is a certain competition between industry, agriculture, and the military for these products. In times of peace they are, with the possible exception of nitric acid, consumed principally in agriculture. In times of war they are used principally in the production of military explosives and propellants and agriculture usually contents itself with whatever fertilizer material may be available, and industry, except for essential war production, suffers a severe cut-back in its supplies of nitrogen.

There is, perhaps, no industry which contributes so much or is so essential to the prosecution of war as the nitrogen industry. Without nitrogen, neither the present day type of common explosives nor propellants could be manufactured.

Summary of production, imports, exports, and apparent consumption

Japan's production of chemical nitrogen fertilizers consists essentially of ammonium sulfate and calcium cyanamide. Of the two, that of sulfate is considerably greater than that of cyanamide. Production of ammonium sulfate increased steadily from about 230,000 metric tons in 1926 to nearly 1,465,000 in 1938. Imports have fluctuated between 200,000 and 400,000 metric tons annually, and have been roughly twice as large as exports. (See table 1.)

A-29

Production of calcium cyanamide increased 25 percent during the period for which data are available (1932-38), and amounted to 354,000 metric tons in 1938. There have been no imports except for 18 metric tons from Korea in 1938. During the period for which data are available, from 10 to 15 percent of the calcium cyanamide produced was exported.

All of the sodium nitrate consumed in Japan is imported; exports are negligible. Imports amounted to only 51,000 metric tons, valued at 4.5 million yen in the period 1934-38.

In addition to these chemical nitrogen fertilizer materials, Japan also produces nitric acid, chiefly from ammonia. During the period for which data are available, production increased from about 15,000 metric tons in 1929 to about 75,000 metric tons in 1939. Import data are not available except for 1938-40, when they are shown to have declined approximately from 4,200 metric tons to 500 metric tons. Exports, ranging between approximately 1,000 and 2,500 metric tons annually (except in the peak year 1934), have represented a continuously declining proportion of rapidly expanding production.

Organization and operation

The fixed nitrogen industry in Japan is an example of extreme flexibility. Japan is the largest producer of ammonia in the Orient. Statistics of production, however, are not available; nor are they for Japan's foreign trade, if any, in ammonia. Most of the ammonia, which is obtained by treating calcium cyanamide with steam, is converted to ammonium sulfate. Some of the ammonia is oxidized to nitric acid, which can also be made by treating imported Chilean nitrate with sulfuric acid. Most of Japan's production of calcium cyanamide was consumed as a fertilizer material, some was converted to ammonia and thence to ammonium sulfate, some converted to urea, and the remainder exported.

Except for imports (declining) of sodium nitrate, which is consumed principally as a fertilizer material, the industry as a whole appears to be capable of functioning quite satisfactorily under normal conditions without any dependence on imports. Even in times of national emergency when imports of sodium nitrate may be cut off, the industry is sufficiently flexible to enable it to be operated to the best advantage of the nation.

Production

PURL: <http://www.legal-tools.org/doc/db1413/>

In general, and in terms of product rather than of the nitrogen content of the products (see description and uses), it appears that Japanese production of ammonium sulfate was twice as great as that of calcium cyanamide which, in turn, was five times as great as that of nitric acid.

Production of ammonium sulfate has increased steadily throughout the period 1928-38--at first slowly from about 230,000 metric tons in 1928 to about 500,000 metric tons in 1934 (an average rate of increase of about 45,000 metric tons per year), and then rapidly at an average rate of about 240,000 metric tons per year to about 1,465,000 metric tons in 1938.

A-29

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Table 2.- Ammonium sulfate: Imports into Japan proper from Empire and other areas, 1928-39

Year	From Empire areas 1/			From other areas			Total	
	Kwantung Munichu- kuo	Korea	Total	Germany	All other	Total		
Quantity (metric tons)								
:								
1928	1,313	2/	2/	1,313	149,119	134,048	283,167	
1929	2,856	2/	2/	2,856	182,515	195,287	377,802	
1930	2,030	2/	31,376	33,406	173,346	127,529	300,875	
1931	6,781	2/	53,260	60,041	154,686	62,681	217,367	
1932	2,987	-	127,663	130,650	75,105	40,643	115,748	
1933	102	6,806	101,435	108,393	80,384	21,157	101,541	
Average,	:	:	:	:	:	:	:	
1928-33	2,678	1,124	52,225	56,110	135,859	96,891	232,750	
1934	-	3,419	109,771	113,400	135,700	21,782	157,482	
1935	-	4,164	62,236	93,370	164,770	152,140	21,058	
1936	-	78,624	40,272	31,016	179,992	137,377	77,673	
1937	-	75,413	21,014	56,561	153,041	73,087	54,664	
1938	-	118,107	3,074	72,244	202,685	124,222	35,420	
Average,	:	:	:	:	:	:	:	
1934-38	-	51,233	21,829	34,731	162,778	126,505	42,160	
1939	-	14,447	3,337	329,355	211,114	-	550	
Value (1,000 yen)								
:								
1928	169	2/	2/	169	18,844	17,290	36,134	
1929	413	2/	2/	413	23,274	24,399	47,673	
1930	166	2/	2,900	3,066	16,992	12,454	29,446	
1931	440	2/	4,102	4,542	10,984	4,437	15,421	
1932	180	-	9,385	9,565	4,188	2,667	6,855	
1933	9	641	9,814	10,464	6,943	1,828	8,771	
Average,	:	:	:	:	:	:	:	
1928-33	229	107	4,367	4,703	13,538	10,512	24,050	
1934	-	293	10,767	11,060	11,681	1,833	13,514	
1935	-	395	5,837	11,132	17,364	12,986	1,851	
1936	-	5,718	4,110	8,856	18,684	15,607	8,495	
1937	-	7,315	1,957	5,837	15,109	6,349	4,570	
1938	-	12,298	841	7,956	21,095	14,639	3,932	
Average,	:	:	:	:	:	:	:	
1934-38	-	5,145	2,607	8,910	16,662	12,253	4,116	
1939	-	7,438	684	13,411	21,533	-	118	
:								

1/ Excluding Mandated Islands, for which data are not available.

2/ Not separately classified.

Source: Compiled from official annual and monthly statistics of Japan, Korea, Formosa, and Mandated Islands.

Exports

In general, Japan's exports of chemical nitrogen fertilizers have been small, and principally to Empire areas, with exports of ammonium sulfate greatly exceeding those of calcium cyanamide. Exports of ammonium sulfate increased steadily from 39,000 metric tons valued at 9.2 million yen in 1934 to 210,000 metric tons valued at 23 million yen in 1938.

Exports of ammonium sulfate and calcium cyanamide are detailed in tables 4 and 5.

Consumption

Japan's consumption of chemical nitrogen fertilizers was approximately 2.7 times as great in 1938 as it was in 1928. This increase was caused chiefly by heavier applications of fertilizer in order to increase the yield per acre.

Most of the consumption was in the form of ammonium sulfate (see table 1), which had regularly accounted for the major portion of consumption. Ranking next in importance was calcium cyanamide, the consumption of which during the period for which data are available (1932-38) ranged between 200,000 and 350,000 metric tons annually. All of the cyanamide, however, is not consumed as such but a certain portion of production (probably from 15 to 20 percent each year) is regularly converted to ammonium sulfate, and a considerably smaller portion is converted to urea for use in fertilizer mixtures.

Consumption of sodium nitrate (approximately equivalent to imports) during the period 1928-38 was small. Declining imports subsequent to 1936, when about 80,000 metric tons were imported, indicates that it was used primarily as a fertilizer material rather than as a source of nitric acid.